



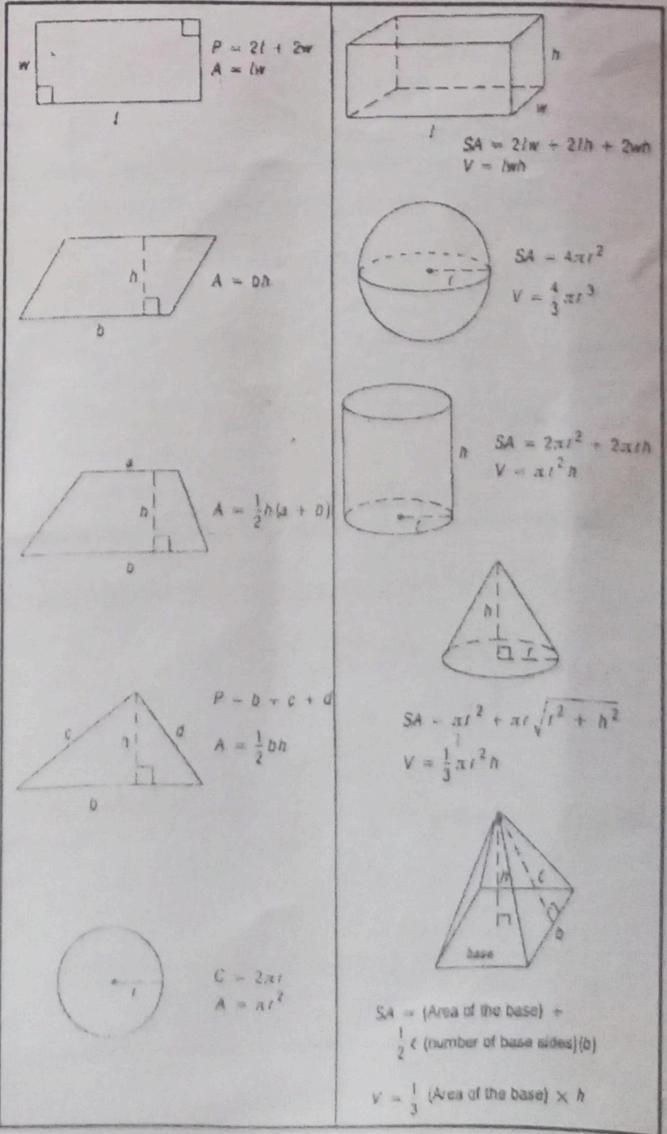
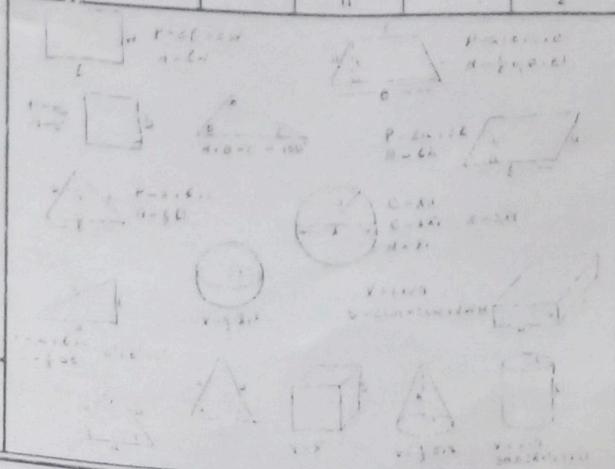
**SUREKEY EXAMINATIONS BOARD
PRE-PLE SUPER SERIES EXAMINATION
2023
MATHEMATICS GUIDE**

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POLYGONS ATTRIBUTE

FOLYGONS	No. of Sides	Angle	No. of Vertices	No. of Diagonals
TRIANGLE	3	60°	3	0
SQUARE	4	90°	4	2
PENTAGON	5	108°	5	5
HEXAGON	6	120°	6	9
HEPTAGON	7	128.6°	7	14
OCTAGON	8	135°	8	20
NONAGON	9	140°	9	27
DE-AAGON	10	144°	10	35
J-GON	n	$\frac{(n-2) \times 180}{n}$	n	$\frac{n(n-3)}{2}$



SECTION A: 40 MARKS

Answer all questions in this Section
Questions 1 to 20 carry two marks each

1. Workout: $16 - 4$.

$$\begin{array}{r} 16 - 4 = 12 \\ \hline OR \\ \begin{array}{r} 16 \\ - 4 \\ \hline 12 \end{array} \end{array}$$

2. Round off 4613 to the nearest hundreds.

$$\begin{array}{r} 4613 \\ + 0 \\ \hline 4600 \\ \hline 4613 \approx 4600 \end{array}$$

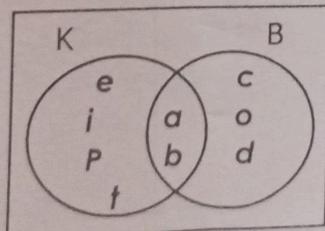
3. Workout: $5 - 1\frac{1}{4}$.

$$\begin{array}{r} 5 - \frac{5}{4} \\ 5 - \frac{5}{4} \\ 1 - \frac{1}{4} \\ \hline 20 - 5 \\ \hline \frac{15}{4} \end{array} = 3\frac{3}{4}$$

$$\begin{array}{r} OR \\ 5 - (1 + 1) + \frac{4}{4} - \frac{1}{4} \\ (5 - 2) + \frac{4 - 1}{4} \\ 3 + \frac{3}{4} \\ 3\frac{3}{4} \end{array}$$

Remember $\frac{1}{4}$ is part of a whole
That is why we are adding another whole

4. Use the Venn diagram below to find $n(K \cap B)'$.



$$(K \cap B)' = \{e, i, p, t, c, o, d\}$$

$$n(K \cap B)' = 7$$

5. Find the next number in the sequence:

$$11, 15, 21, 29, 38, \dots$$

$$11 + 4 = 15$$

$$15 + 6 = 21$$

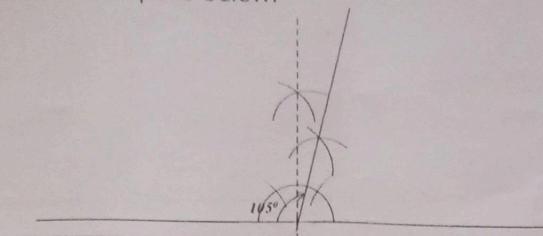
$$21 + 8 = 29$$

$$29 + 9 = 38$$

$$38 + 10 = 48$$

Adding composite numbers

6. Using a pair of compasses, ruler and pencil only, construct an angle of 105° in the space below.



7. A car uses 4 litres of petrol every day. How many $\frac{1}{4}$ litre bottles of petrol does the car use in the day?

$$\begin{aligned} \text{Number of litres} &= 4 \div \frac{1}{4} \\ &= 4 \times \frac{4}{1} \\ &= 16 \\ \therefore \text{The car uses } &16 \frac{1}{4} \text{ litre bottles} \end{aligned}$$

8. Simplify: $8 - 3(m + 5)$.

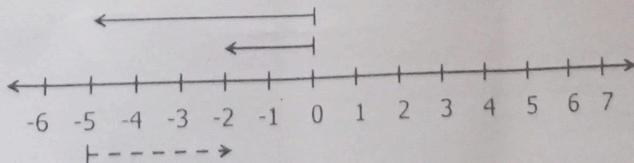
$$8 - (3 \times m) - (3 \times 5)$$

$$8 - 3m - 15$$

$$8 - 15 - 3m$$

$$\underline{-7 - 3m}$$

9. Write the mathematical statement shown on the number line below.



$$-2 - 5 = +3$$

10. The total mass of 4 girls is 146kg. The average weight of three of them is 36.1kg. Find the mass of the fourth girl.

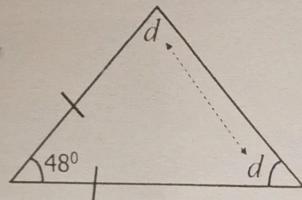
Total mass of three girls

$$= \begin{array}{r} 36, 1 \\ \times 3 \\ \hline 108, 3 \end{array}$$

Mass of fourth girl

$$= \begin{array}{r} 146, 0 \\ - 108, 3 \\ \hline 37, 7 \end{array}$$

11. Find the size of angle marked d in the figure below



$$\begin{aligned} d + d + 48^\circ &= 180^\circ \text{ (int <sum of a triangle)} \\ 2d + 48^\circ &= 180^\circ \\ 2d + 48^\circ - 48^\circ &= 180^\circ - 48^\circ \\ 2d &= 132^\circ \\ \frac{2d}{2} &= \frac{132^\circ}{2} \\ d &= 66^\circ \end{aligned}$$

12. Solve for y : $3^y \times 3^2 = 27$.

$$\begin{array}{lcl} 3^y \times 3^2 & = & 27 \\ 3^y \times 3^2 & = & 3^3 \\ 3^{(y+2)} & = & 3^3 \\ y+2 & = & 3 \\ y+2-2 & = & 3-2 \\ y & = & 1 \end{array}$$

3	27
3	9
3	3
	1

13. Given the exchange rates below,

1 USD costs Ugsh.3,600.

1 Ksh costs Ugsh.36.

Workout the cost of a mattress in US dollar if it costs Ksh.14,000.

$$\frac{\text{buying rate}}{\text{selling rate}} \times \text{amount}$$

$$\frac{\text{USD } (\text{Ugsh. } 36)}{(\text{Ugsh. } 3600)} \times 14000$$

$$\text{USD } 140$$

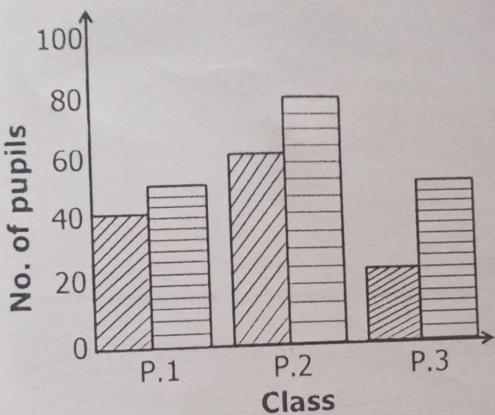
OR

$$\begin{aligned} \text{Cost in Ugsh} \\ 36 \times 14000 \\ \text{Ugsh. } 504000 \\ \text{Cost in USD} \\ \text{Ugsh. } 504000 \\ \text{Ugsh. } 3600 \\ \text{USD } 140 \end{aligned}$$

14. Use distributive property to workout: $(8 \div 3) + (10 \div 3)$.

$$\begin{aligned}(8 + 10) \div 3 \\ 18 \div 3 \\ 6\end{aligned}$$

15. The graph below shows the number of pupils, boys and girls respectively in the Lower section of Habanomu Junior School.



Express the number of pupils in P.2 as a percentage of the total number of pupils in Lower primary.

<u>Number of pupils in P.1</u>	<u>Total number of pupils in school</u>	<u>Percentage of P.2</u>
$40 + 50$	140	$\frac{140}{300} \times 100\%$
90 pupils	90	$\frac{140}{300} \times 100\%$
<u>Number of pupils in P.2</u>	$+ 70$	$\frac{140}{300} \times 100\%$
60 + 80	300 pupils	$\frac{140}{300} \times 100\%$
140 pupils		$46\frac{2}{3}\%$
<u>Number of pupils in P.3</u>		
20 + 30		
50 pupils		

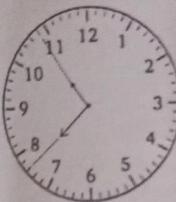
16. Trees are planted along a straight road at intervals of 10m. Find the distance from the first to the eleventh pole.

OR

$$\begin{aligned}Distance &= Number \text{ of spaces} \times interval \\ &= (11 - 1) \times 10m \\ &= 10 \times 10m \\ &= 100m\end{aligned}$$

$$\begin{aligned}Distance &= (Position - 1) \times interval \\ &= (11 - 1) \times 10m \\ &= 10 \times 10m \\ &= 100m\end{aligned}$$

17. Use the clock face below to show 22 minutes to 11 o'clock.



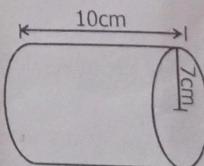
18. Today is Monday, term three starts. It will end after 74 days from today. On which day of the week will the term end?

$$\begin{aligned}
 Mon + 74 &= \dots \pmod{7} \\
 1 + 74 &= \dots \pmod{7} \\
 75 &= \dots \pmod{7} \\
 \underline{75} &= 10 \text{ rem } 5 \pmod{7} \\
 7 &= 5 \pmod{7}
 \end{aligned}$$

5 represents Friday

∴ The term will end on Friday

19. Calculate the total surface area of the cylinder below.



$$\begin{aligned}
 TSA &= \pi r^2 + 2\pi rh \\
 &= (\frac{22}{7} \times 7 \times 7) + (2 \times \frac{22}{7} \times 7) \times 10 \\
 &= 154 + 440 \\
 &= 594 \text{ cm}^2
 \end{aligned}$$

OR

$$\begin{aligned}
 C &= 2\pi r \\
 &= 2 \times \frac{22}{7} \times 7 \text{ cm} \\
 &= 2 \times 22 \text{ cm} \\
 &= 44 \text{ cm}
 \end{aligned}$$

Area of rectangular sheet

$$\begin{aligned}
 Area &= L \times W \\
 &= 44 \text{ cm} \times 10 \text{ cm} \\
 &= 440 \text{ cm}^2
 \end{aligned}$$

Area of two circles

$$\begin{aligned}
 A &= \pi r^2 \\
 &= \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \\
 &= 22 \text{ cm} \times 7 \text{ cm} \\
 &= 154 \text{ cm}^2
 \end{aligned}$$

Total surface area

$$\begin{aligned}
 &440 \text{ cm}^2 + 154 \text{ cm}^2 \\
 &594 \text{ cm}^2
 \end{aligned}$$

20. The product of two numbers is 54. The LCM of the two numbers is 18. Find their GCF.

$$\begin{aligned}
 \text{Product of numbers} &= LCM \times GCF \\
 \frac{54}{48} &= \frac{18 \times GCF}{48} \\
 3 &= GCF \\
 GCF &= 3
 \end{aligned}$$

21. In a market, 27 traders only. $(d+5)$ traders items.

(a) Complete the

(b) If 29 traders

$(d+1)$

$d+d$

$2d+1$

$2d+1$

2

(c) How many

$(d+1)$

$(7+1)$

$17+1$

44

$\therefore 44$ trade

22. (a) Add:

tes to 11 o'clock.

end after 74 days from today.

(Use π as $\frac{22}{7}$)



$\frac{22}{7} \times 7\text{cm}$

2cm

$44\text{cm} \times 10\text{cm}$

$440\text{cm}^2 + 154\text{cm}^2$

594cm^2

of the two numbers is 18.

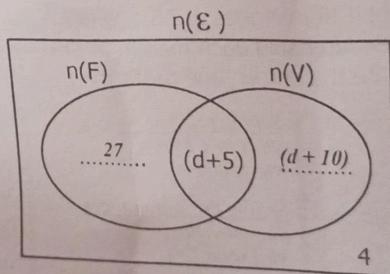
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SECTION B: 60 MARKS

Answer all questions in this section
Marks for each question are indicated in brackets.

21. In a market, 27 traders sell Fruits (F) only. $(d+10)$ traders sell vegetables (V) only. $(d+5)$ traders sell both Fruits and Vegetables, while 4 traders sell other items.

- (a) Complete the Venn diagram below using the above information.
(02 Marks)



- (b) If 29 traders sell vegetables, find the value of d ?
(02 Marks)

$$\begin{aligned}(d+10) + (d+5) &= 29 \\ d + d + 10 + 5 &= 29 \\ 2d + 15 &= 29 \\ 2d + 15 - 15 &= 29 - 15 \\ 2d &= 14 \\ \frac{2d}{2} &= \frac{14}{2} \\ d &= 7\end{aligned}$$

- (c) How many traders sell only one item?
(01 Mark)

$$\begin{aligned}(d+10) + 27 \\ (7+10) + 27 \\ 17 + 27 \\ 44\end{aligned}$$

∴ 44 traders sell only one item

22. (a) Add:
$$\begin{array}{r} 1 \ 2 \ 1 \text{ three} \\ + 2 \ 2 \text{ three} \\ \hline 2 \ 2 \ 0 \text{ three} \end{array}$$

$$\begin{aligned}1 + 2 &= 3 \\ 3 + 3 &= 1 \text{ rem } 0 \\ 1 + 2 + 2 &= 5 \\ 5 + 3 &= 1 \text{ rem } 2 \\ 1 + 1 &= 2\end{aligned}$$

(02 Marks)

- (b) Given that $101_k = 1101_{\text{three}}$. Find the value of the base represented by letter k .

(03 Marks)

$$\begin{aligned}
 (1 \times k^2) + (0 \times k^1) + (1 \times k^0) &= (1 \times 3^1) + (1 \times 3^2) + (0 \times 3^1) + (1 \times 3^0) \\
 (1 \times k^2) + (0 \times k) + (1 \times 1) &= (1 \times 3 \times 3 \times 3) + (1 \times 3 \times 3) + (0 \times 3) + (1 \times 1) \\
 k^2 + 0 + 1 &= 27 + 9 + 0 + 1 \\
 k^2 + 1 &= 37 \\
 k^2 + 1 - 1 &= 37 - 1 \\
 k^2 &= 36 \\
 k^2 &= 36 \\
 k &= 6 \\
 k &= \underline{\text{base six}}
 \end{aligned}$$

[Accept other correct approaches]

23. A trader bought 120 mangoes at Sh.120 per mango and 30 oranges at Sh.400 each. He later sold each mango at Sh.150 and each orange at Sh.500. Calculate the percentage profit the trader made. (04 Marks)

<u>Cost of mangoes</u>	<u>Selling price of mangoes</u>	<u>profit</u>
Sh. 120 x 120	Sh. 120 x 150	$S.P - B.P$
Sh. 14400	Sh. 18000	$Sh. 33000 - sh. 26400$
<u>Cost of oranges</u>	<u>Selling price of oranges</u>	<u>Sh. 6600</u>
Sh. 400 x 30	Sh. 500 x 30	<u>Percentage profit</u>
Sh. 12000	Sh. 15000	$\frac{Sh. 6600}{Sh. 26400} \times 100\%$
<u>Total cost of the two items</u>	<u>Selling price of the two items</u>	$= 25\%$
Sh. 14400 + sh. 12000	Sh. 14400 + sh. 12000	
Sh. 26400	Sh. 33000	

OR

<u>Cost of mangoes</u>	<u>Profit on mangoes</u>	<u>Percentage profit</u>
Sh. 120 x 120	sh. 120 x (sh. 150 - sh. 120)	$\frac{Sh. 6600}{Sh. 26400} \times 100\%$
Sh. 14400	120 x sh. 30	
	sh. 3600	
<u>Cost of oranges</u>	<u>Profit in oranges</u>	$= 25\%$
Sh. 400 x 30	30 x (sh. 500 - sh. 100)	
Sh. 12000	30 x sh. 100	
	sh. 3000	
<u>Total cost of the two items</u>	<u>Total profit</u>	
Sh. 14400 + sh. 12000	sh. 3000 + sh. 3600	
Sh. 26400	sh. 6600	

24. Nantongo bought

Item
Pineapples
Rice
Cooking oil

$$\begin{aligned}
 \text{(a)} \quad &\text{Complete} \\
 &\text{pineapples} \\
 &\frac{4}{2} \times sh. 50 \\
 &sh. 4 \times 250 \\
 &sh. 10000
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad &\text{If Nanton} \\
 &\text{was she} \\
 &\frac{10}{10} \\
 &sh. 10000
 \end{aligned}$$

25. The interior angle. Name the

Let the exterior

$$Interior \angle = v + 20\%$$

$$v + v + 20\% = 2v + 20\%$$

$$2v + 20\% = 180^\circ$$

$$\frac{2v}{2}$$

$$v$$

24. Nantongo bought the following from the market.

Item	Quantity	Unit Cost	Amount
Pineapples	4 pineapples	Sh.5,000 for every 2 pineapples	Sh.10000....
Rice3.....kg	Sh.8,000 per kg	Sh.24,000
Cooking oil	500ml	Sh.8000....per litre	Sh.4,000
TOTAL EXPENDITURE			Sh.38000....

- (a) Complete the table above.

(04 Marks)

<u>pineapples</u>	<u>rice</u>	<u>cooking oil</u>	<u>total expenditure</u>
$\frac{4}{2} \times sh. 5000$	$sh. 24000$	$sh. 4000 \div 500ml$	$sh. 24000$
$sh. 4 \times 2500$	$sh. 8000$	$1000ml$	$sh. 10000$
$sh. 10000$	3	$sh. 4000 \times 4000^2$	$sh. 4000$
		500	$+ sh. 38000$
		$sh. 4000 \times 2$	
		$sh. 8000$	

- (b) If Nantongo was given a discount of 10%, how much discount was she given? (01 Mark)

$$\frac{10}{100} \times sh. 38000$$

$$10 \times sh. 380$$

$$Sh. 380$$

She was given sh.3800

25. The interior angle of a regular polygon is 20% more than its exterior angle. Name the polygon. (05 Marks)

Let the exterior angle be y

Exterior angle

Interior angle will be:

$$\frac{40}{100} \times 180^\circ$$

$$y + 20\%$$

$$4 \times 18$$

$$y + y + 20\% = 100\%$$

$$72^\circ$$

$$2y + 20\% = 100\%$$

Number of sides

$$2y + 20\% - 20\% = 100\% - 20\%$$

$$\frac{360^\circ}{72^\circ}$$

$$2y = 80\%$$

$$5$$

$$\underline{2}y = 80\%$$

$$sides$$

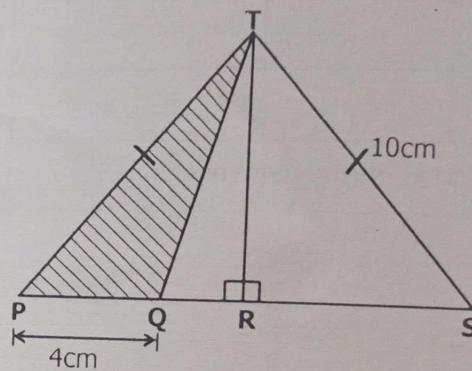
$$2 = 2$$

$$Pentagon$$

$$y = 40\%$$

(a) Using a parallelogram
 $QR = 4\text{cm}$

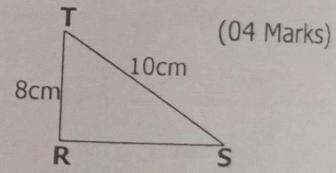
26. PST is an isosceles triangle. The area of the shaded part is 16cm^2 . Study and carefully use it to answer the questions that follow.



- (a) Find the length of QR.

Height (TR)

$$\begin{aligned}\frac{b \times h}{2} &= A \\ \frac{4\text{cm} \times h}{2} &= 16\text{cm}^2 \\ \frac{4\text{cm} \times h}{2} \times 2 &= 16\text{cm}^2 \times 2 \\ 4\text{cm} \times h &= 32\text{cm}^2 \\ \frac{4\text{cm} \times h}{4\text{cm}} &= \frac{32\text{cm} \times \cancel{cm}}{\cancel{4\text{cm}}} \\ h &= 8\text{cm}\end{aligned}$$



(04 Marks)

$$\begin{aligned}a^2 &= c^2 - b^2 \\ a^2 &= (10\text{cm})^2 - (8\text{cm})^2 \\ a^2 &= (10 \times 10) - (8 \times 8) \\ a^2 &= 100 - 64 \\ a^2 &= 36 \\ a &= \sqrt{36} \\ a &= 6\text{cm} \\ RS &= 6\text{cm} \\ RS &= PR \\ PR &= 6\text{cm} \\ QR &= 6\text{cm}^2 - 4\text{cm} \\ QR &= 2\text{cm}\end{aligned}$$

- (b) Work out the perimeter of triangle PST.

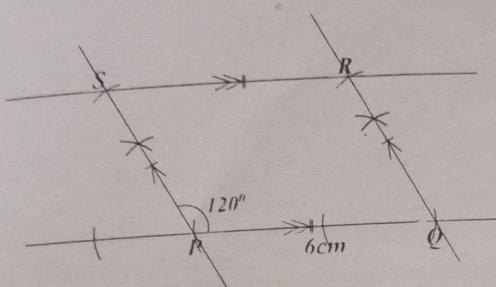
$$\begin{aligned}Perimeter &= \text{sum of all sides} \\ &= 10\text{cm} + 10\text{cm} + (6\text{cm} + 6\text{cm}) \\ &= 20\text{cm} + 12\text{cm} \\ &= 32\text{cm}\end{aligned}$$

(02 Marks)

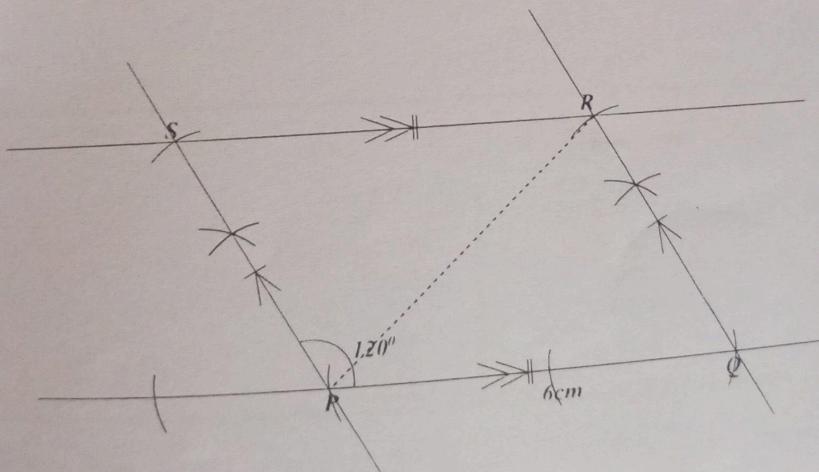
(b) Draw

- 16cm².
w.
- (a) Using a pair of compasses, a ruler and a pencil only, construct a parallelogram PQRS where PQ = 6cm, angle SPQ = 120° and QR = 4cm. (04 Marks)

SKETCH



ACCURATE DRAWING



(04 Marks)

S

-(8cm)²
-(8 x 8)

n

02 Marks)

- (b) Draw diagonal PR and measure angle PRQ. 79°, 80°, 81° (01 M)

10. The Pie-Chart below shows

(a) Solve for x : $\frac{3x}{5} + 7 = x - 9$. (03 Marks)

$$\begin{aligned}\frac{3x}{5} + 7 \times 5 &= 5(x - 9) \\ 3x + 35 &= 5x - 45 \\ 3x + 35 - 35 &= 5x - 45 - 35 \\ 3x &= 5x - 80 \\ 3x - 5x &= 5x - 5x - 80 \\ \frac{-2x}{2} &= \frac{+80}{2} \\ x &= 40\end{aligned}$$

(a) Find the solution set for t : $2 - 2t \leq 8$. (03 Marks)

$$\begin{aligned}2 - 2 - 2t &\leq 8 - 2 \\ -2t &\leq 6 \\ \frac{-2t}{2} &\geq \frac{6}{2} \\ t &\geq -3 \\ t &\in \{-3, -2, -1, \dots\}\end{aligned}$$

(a) Workout: $3.61 - 0.89$ (02 Marks)

$\begin{array}{r} 3.61 \\ - 0.89 \\ \hline 2.72 \end{array}$	$\left \begin{array}{r} OR \\ \frac{361}{100} - \frac{89}{100} \\ \frac{361 - 89}{100} \\ \frac{272}{100} \\ 2.72 \end{array} \right.$
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(b) Simplify: $\frac{3}{4} \div 1\frac{1}{2} - \frac{1}{4}$ (03 Marks)

$$\begin{aligned}\frac{3}{4} \div \frac{3}{2} - \frac{1}{4} \\ \frac{3}{4} \times \frac{2}{3} - \frac{1}{4} \\ \frac{1}{2} - \frac{1}{4} \\ \frac{2-1}{4} \\ \frac{1}{4}\end{aligned}$$

(a) Find the value of

$$\begin{aligned}(6k + 20^{\circ}) + 7k + & \\ 6k + 7k + 20^{\circ} + & \\ 13k + & \\ 13k + &\end{aligned}$$

(b) If he earns Sh. monthly earnings

diary + banana

$90^{\circ} + 120^{\circ}$

210°

monthly earn

sh. 630000 +

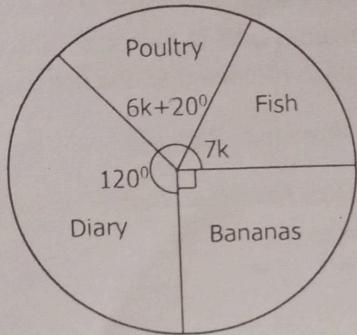
sh. 630000 x

sh. 3000 x 36

sh. 1080000

30. The Pie-Chart below shows how a farmer earns from his farm monthly.

(03 Marks)



(02 Marks)

- (a) Find the value of k.

$$\begin{aligned}
 (6k + 20^\circ) + 7k + 120^\circ + 90^\circ &= 360^\circ \\
 6k + 7k + 20^\circ + 120^\circ + 90^\circ &= 360^\circ \\
 13k + 230^\circ &= 360^\circ - 230^\circ \\
 13k + 230^\circ - 230^\circ &= 130^\circ \\
 13k &= 130^\circ \\
 \frac{13k}{13} &= \frac{130^\circ}{13} \\
 k &= 10^\circ
 \end{aligned}$$

(03 Marks)

(02 Marks)

- (b) If he earns Sh.630,000 from diary and bananas. Calculate his monthly earnings.

(02 Marks)

Accept other approaches

diary + bananas

$$90^\circ + 120^\circ$$

$$210^\circ$$

monthly earning

$$\text{sh. } 630000 \div \frac{210^\circ}{360^\circ}$$

$$\text{sh. } 630000 \times \frac{360^\circ}{210^\circ}$$

$$\text{sh. } 3000 \times 360$$

$$\text{sh. } 1080000$$

(03 Marks)

31. Sulaiman drove from Kampala to Mbale at an average speed of 72 km/hr for $2\frac{1}{2}$ hrs. He then drove back to Kampala using the same route at a speed which was 18 km/hr more than the first journey.

(a) How far is Mbale from Kampala?

(02 Marks)

Distance from Kampala to Mbale

$$\begin{aligned} &= S \times T \\ &= \frac{72 \text{ km}}{\text{hr}} \times 2\frac{1}{2} \text{ hr} \\ &= 72 \times \frac{5}{2} \\ &= 36 \times 5 \\ &= \underline{\underline{180 \text{ km}}} \end{aligned}$$

(b) Calculate Sulaiman's average speed for the whole journey.

(a) Calculu

(03 Marks)

speed used on the second journey

$$\begin{aligned} &= 72 \text{ km/hr} + 18 \text{ km/hr} \\ &= 90 \text{ km/hr} \end{aligned}$$

time for the second journey

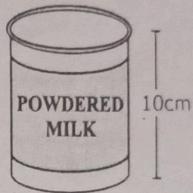
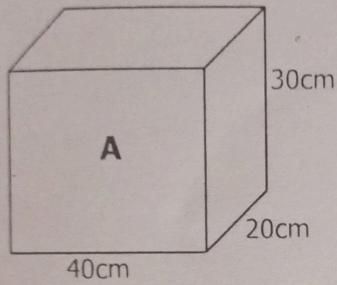
$$\begin{aligned} &= \frac{d}{s} \\ &= \frac{180 \text{ km}}{90 \text{ km}} \\ &= \frac{180 \text{ km}}{\frac{90 \text{ km}}{\text{hr}}} \\ &= 2 \text{ hrs} \end{aligned}$$

$$\begin{aligned} \text{average speed} &= \frac{TDC}{TTT} \\ &= \frac{180 \text{ km} \times 2}{(2 \text{ hr} + 2\frac{1}{2} \text{ hr})} \\ &= \frac{360 \text{ km}}{4\frac{1}{2} \text{ hr}} \\ &= \frac{360 \text{ km}}{9 \text{ hr}} \\ &= \frac{360 \text{ km} \times \frac{2}{9}}{9 \text{ hr}} \\ &= \frac{40 \text{ km}}{\frac{2}{9} \text{ hr}} \\ &= \underline{\underline{80 \text{ km/hr}}} \end{aligned}$$

speed of 72km/hr
same route at a

(02 Marks)

32. Box (A), 40cm long, 20cm wide and 30cm high was packed with 4 small cylindrical tins of powdered milk of height 10cm. After packing all the tins, a space of 17840cm^3 remained in the box.



- (a) Calculate the volume of each tin. (03 Marks)

Volume of Box A

$$\begin{aligned}V &= L \times W \times H \\V &= 40\text{cm} \times 20\text{cm} \times 30\text{cm} \\V &= 24000\text{cm}^3\end{aligned}$$

Volume of 4 tins

$$\begin{aligned}&24000\text{cm}^3 \\&- 17840\text{cm}^3 \\&\underline{6160\text{cm}^3}\end{aligned}$$

Volume of each tin

$$\begin{aligned}&\frac{6160}{4} \\&\underline{1540\text{cm}^3}\end{aligned}$$

- (b) Find the radius of the tin. (Use as $\frac{22}{7}$) (02 Marks)

$$\begin{aligned}\pi r^2 h &= v \\22r^2 \times 10\text{cm} &= 1540\text{cm}^3 \\7 &\\7 \times 22r^2 &= 1540\text{cm}^3 \times 7 \\22r^2 &= \frac{1540 \times 7 \times \text{cm} \times \text{cm} \times \text{cm}}{220\text{cm}} \\r^2 &= \frac{7 \times 7\text{cm}^2}{49\text{cm}^2} \\r &= 7\text{cm}\end{aligned}$$